

Claims

[c1] What is claimed is:

1.A display panel comprising:

a silicon substrate with a pixel area located in a surface of the silicon substrate;

a micro color filter disposed on the pixel area on the silicon substrate;

a liquid crystal layer disposed on the micro color filter;

a top alignment layer positioned on the liquid crystal layer; and

a transparent conductive layer disposed on the top alignment layer;

wherein when light enters into the display panel, only a specific spectrum of light is permitted to transmit through the micro color filter and is then reflected upward by the silicon substrate to form images.

[c2] 2.The display panel of claim 1 wherein the display panel further comprises a bottom alignment layer disposed between the liquid crystal layer and the micro color filter.

[c3] 3.The display panel of claim 1 wherein the display panel further comprises a bottom alignment layer disposed between the silicon substrate and the micro color filter.

- [c4] 4.The display panel of claim 1 wherein the display panel further comprises a driving circuit disposed on the surface of the silicon substrate, the driving circuit comprising a plurality of metal electrodes to reflect incident light through the micro color filter upward to form images.
- [c5] 5.The display panel of claim 1 wherein the micro color filter is composed of a plurality of stacked optical thin films, and comprises a low index optical thin film stack or a high index optical thin film stack.
- [c6] 6.The display panel of claim 5 wherein the low index optical thin film stack comprises a silicon oxide (SiO_2) layer.
- [c7] 7.The display panel of claim 5 wherein the high index optical thin film comprises a titanium oxide (TiO_2) layer or a tantalum oxide (Ta_2O_5) layer.
- [c8] 8.The display panel of claim 1 wherein the liquid crystal layer comprises liquid molecules aligned in a homeotropic type or a twist nematic type.
- [c9] 9.The display panel of claim 1 wherein a thickness of the liquid crystal layer is about 0.5 to 10 microns.
- [c10] 10.A display panel comprising:
a silicon substrate with a first pixel area, a second pixel area, and a third pixel area defined in a surface of the

silicon substrate;
a first micro color filter, a second micro color filter, and
a third micro color filter respectively disposed in the first
pixel area, the second pixel area, and the third pixel area
on the surface of the silicon substrate;
a bottom alignment layer disposed on the first micro
color filter, the second micro color filter, and the third
micro color filter;
a liquid crystal layer disposed on the bottom alignment
layer;
a top alignment layer disposed on the liquid crystal
layer; and
a transparent conductive layer disposed on the top
alignment layer;
wherein when light enters the display panel, lights of a
first specific spectrum, a second specific spectrum, and a
third specific spectrum are reflected from the first pixel
area, the second pixel area, and the third pixel area re-
spectively.

- [c11] 11. The display panel of claim 10 wherein the display
panel further comprises a driving circuit disposed on a
surface of the silicon substrate to drive the substrate and
reflect light transmitting through the first micro color fil-
ter, the second micro color filter, and the third micro
color filter upward to form images.

- [c12] 12.The display panel of claim 10 wherein light of the first specific spectrum, the second specific spectrum, and the third specific spectrum are red, blue, and green light respectively.
- [c13] 13.The display panel of claim 10 wherein each of the first micro color filter, the second micro color filter, and the third micro color filter is composed of a plurality of stacked optical thin films, and comprises a low index optical thin film stack or a high index optical thin film stack.
- [c14] 14.The display panel of claim 13 wherein the low index optical thin film stack comprises a silicon oxide (SiO_2) layer.
- [c15] 15.The display panel of claim 13 wherein the high index optical thin film comprises a titanium oxide (TiO_2) layer or a tantalum oxide (Ta_2O_5) layer.
- [c16] 16.The display panel of claim 10 wherein the liquid crystal layer comprises liquid molecules aligned in a homeotropic type or a twist nematic type.
- [c17] 17.The display panel of claim 10 wherein a thickness of the liquid crystal layer is about 0.5 to 10 microns.
- [c18] 18.The display panel of claim 10 wherein the display

panel further comprises a cooling system on the silicon substrate.